

Poster presentation

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## Patient selection and definition of transcatheter prosthesis size using magnetic resonance imaging: initial experience

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from 13th Annual SCMR Scientific Sessions  
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

*Journal of Cardiovascular Magnetic Resonance* 2010, **12**(Suppl 1):P80 doi:10.1186/1532-429X-12-S1-P80

This abstract is available from: <http://jcmr-online.com/content/12/S1/P80>

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### Introduction

Transcatheter aortic valve replacement requires accurate analysis of aortic annulus, ascending aorta as well as the relation between the aortic annulus and origin of the coronary arteries for correct patient and prosthesis size selection. Multislice computed tomography (MSCT) is currently the preferred imaging modality for preprocedural planning. However, MSCT is associated with radiation exposure and the need for contrast administration.

### Purpose

This study evaluated whether patient selection and definition of transcatheter prosthesis size can also be derived using cardiac magnetic resonance (CMR).

### Methods

13 patients (age  $79 \pm 7$ ) with severe aortic stenosis evaluated for transcatheter aortic valve replacement (Corevalve<sup>®</sup>) underwent dual-source MSCT (Definition, Siemens, Forchheim, Germany) and CMR (1.5 Tesla, Achieva, Philips, Best, the Netherlands) to define aortic annulus, bulbous and ascending aorta dimensions as well as the distance from the aortic annulus to the left coronary artery. For CMR non-contrast-enhanced navigator-gated 3-D whole heart acquisition was conducted (voxel size  $1.2 \times 1.2 \times 1.8$ , TR/TE 4.9/2.9, flip angle  $100^\circ$ ). CMR-images were analyzed using a 3D-reconstruction tool (EWS,

Philips, the Netherlands). Coronal CT-images were reconstructed for evaluation at an external workstation.

### Results

The aortic annulus diameter was  $24 \pm 2$  mm by MSCT and  $24 \pm 2$  mm by CMR (limits of agreement 3%,  $r = 0.7$ ,  $p < 0.001$ ). The diameter of the ascending aorta was  $32 \pm 4$  mm by MSCT and  $30 \pm 3$  mm by CMR (limits of agreement 6%,  $r = 0.7$ ,  $p < 0.01$ ). The aortic bulbous diameter was  $33 \pm 2$  mm with MSCT and  $30 \pm 3$  mm measured by CMR (limits of agreement  $\pm 6\%$ ,  $r = 0.4$ ,  $p = 0.29$ ).

The distance of the aortic annulus to the left coronary artery was  $14 \pm 2$  mm by MSCT and  $14 \pm 2$  mm by CMR (limits of agreement 2.2%,  $r = 0.84$ ,  $p < 0.01$ ). Based on MSCT measurements, all patients were accepted for aortic revalving. 11 patients (80%) were selected to receive a 26 mm Corevalve<sup>®</sup> prosthesis and 2 patients (15%) were selected to receive a 29 mm prosthesis. Based on CMR-measurements the same decision was made in all cases (100%).

### Conclusion

CMR allows accurate analysis of aortic annulus and ascending aorta dimensions without the need for radiation or contrast-agent exposure. It is non-inferior to MSCT for patient selection and definition of transcatheter prosthesis size. The slight differences between these two meth-

ods may be explained by the inferiority of CMR to visualize calcification.

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